

PWE-062

### 3D-MAGMA: A NOVEL WAY OF MEASURING GASTROINTESTINAL MOTILITY IN PATIENTS WITH INFECTIOUS DIARRHOEA

doi:10.1136/gut.2011.239301.325

J Felber,<sup>1,\*</sup> S Paetzold,<sup>2</sup> H Richert,<sup>3</sup> A Stallmach<sup>1</sup> <sup>1</sup>Department of Gastroenterology and Hepatology, University Hospital Jena, Jena, Germany; <sup>2</sup>Centre of Internal Medicine, Klinikum Altenburger Land, Altenburg, Germany; <sup>3</sup>Innovent Technologieentwicklung, Jena, Germany

**Introduction** The current means of measuring gut motility are limited. Manometry and scintigraphic transit tests are the two most commonly used tests to investigate small bowel motility. Diarrhoeal symptoms are a frequent problem in clinical practise. They can be explained by abnormalities in the absorption and secretion of fluids but also by changes in the motility of the small and large intestine.

**Methods** 20 healthy volunteers and 7 patients with infectious diarrhoea (ID) caused by salmonella spec. underwent motility testing of the small bowel by a high-resolution three-dimensional magnetic detection system called 3D-MAGMA. A new technique that allows the tracking of a magnetic capsule in three-dimensional space with high accuracy in position and orientation by sensors placed above a supine patient.

**Results** The pacemaker frequency in patients with infectious diarrhoea (median: 10.6; min-max: 8.4–11.8; (cpm)) did not differ from that in healthy controls (median: 10.7; min-max: 8.4–12.9). There was a tendency of the capsule in patients with diarrhoeal symptoms to cover a greater distance in the first hour after leaving the stomach (controls: median: 150; min-max: 82–262; ID: median: 175; min-max: 135–315; (cm)). The time proportion of spike-wave activity (>0.2 cm/s) in the duodenum was higher in all participants compared to the jejunum as was the velocity of the capsule in the duodenum. However, while patients with infectious diarrhoea showed an increase of strong spike-wave activity (>0.5 cm/s) in the jejunum compared to the duodenum, strong spike-wave activity was absent in the jejunum of controls.

For both groups a negative correlation could be found for the time proportion of spike-wave activity (>0.2 cm/s) and the length of time the capsule spent in the duodenum (controls:  $rs=-0.95$ ;  $p<0.0001$ ; ID:  $rs=-0.91$ ;  $p=0.004$ ). While this could also be shown in the jejunum for controls the correlation was lost in diarrhoea sufferers (controls:  $rs=-0.91$ ;  $p<0.0001$ ; ID:  $rs=-0.62$ ;  $p=0.14$ ).

**Conclusion** Abnormalities in small bowel motility play an important part in developing diarrhoeal symptoms in patients with gastroenteritis. Especially the distal small bowel appears to be of importance in the development of symptoms. Small bowel testing with magnetic marker monitoring enhances the understanding of the underlying pathophysiology in these patients.

**Competing interests** None.

**Keywords** 3D-MAGMA Capsule, diarrhoea, Gastroenteritis, infectious diarrhoea, small bowel motility.

**REFERENCES**

1. Spiller R. Role of motility in chronic diarrhoea. *Neurogastroenterol Motil* 2006;18:1045–55.
2. Grybäck P, *et al.* Scintigraphy of the small intestine: a simplified standard for study of transit. *Eur J Nucl Med Mol Imaging* 2002;29:39–45.
3. Hocke M, *et al.* Every slow-wave impulse is associated with motor activity of the human stomach. *Am J Physiol Gastrointest Liver Physiol* 2009;296:G709–16.